PACE-IIT & MEDICAL

AITS–08-(NEET 2023 Aspirants) – Answer key & Solutions

1. (3)	2. (3)	3. (3)	4. (4)	5. (Bonus)
6. (2)	7. (3)	8. (2)	9. (2)	10. (2)
11. (1)	12. (4)	13. (3)	14. (4)	15. (3)
16. (2)	17. (4)	18. (4)	19. (Bonus)	20. (2)
21. (2)	22. (4)	23. (3)	24. (1)	25. (4)
26. (2)	27. (4)	28. (1)	29. (2)	30. (2)
31. (4)	32. (4)	33. (4)	34. (3)	35. (3)
36. (2)	37. (1)	38. (2)	39. (4)	40. (1)
41. (2)	42. (2)	43. (1)	44. (3)	45. (3)
46. (3)	47. (3)	48. (2)	49. (2)	50. (2)
51. (3)	52. (1)	53. (4)	54. (3)	55. (3)
56. (4)	57. (2)	58. (4)	59. (1)	60. (4)
61. (1)	62. (1)	63. (3)	64. (2)	65. (3)
66. (2)	67. (3)	68. (3)	69. (3)	70. (1)
71. (1)	72. (2)	73. (3)	74. (2)	75. (4)
76. (1)	77. (4)	78. (1)	79. (2)	80. (3)
81. (3)	82. (3)	83. (1)	84. (3)	85. (1)
86. (2)	87. (3)	88. (4)	89. (2)	90. (2&4)
91. (2)	92. (4)	93. (4)	94. (4)	95. (2)
96. (2)	97. (3)	98. (2)	99. (2)	100. (3)
101. (1)	102. (2)	103. (1)	104. (3)	105. (3)
106. (2)	107. (3)	108. (3)	109. (2)	110. (1)
111. (3)	112. (2)	113. (1)	114. (3)	115. (4)
116. (3)	117. (3)	118. (3)	119. (4)	120. (3)
121. (1)	122. (3)	123. (3)	124. (3)	125. (2)
126. (1)	127. (1)	128. (3)	129. (3)	130. (3)
131. (2)	132. (2)	133. (3)	134. (2)	135. (3)
136. (4)	137. (2)	138. (4)	139. (1)	140. (4)
141. (2)	142. (4)	143. (3)	144. (3)	145. (1)
146. (2)	147. (2)	148. (3)	149. (1)	150. (2)
151. (3)	152. (3)	153. (2)	154. (1)	155. (2)
156. (3)	157. (1)	158. (2)	159. (1)	160. (4)
161. (3)	162. (1)	163. (3)	164. (3)	165. (4)
166. (1)	167. (1)	168. (4)	169. (3)	170. (4)
171. (3)	172. (2)	173. (4)	174. (4)	175. (2)
176. (1)	177. (2)	178. (3)	179. (1)	180. (2)
181. (2)	182. (4)	183. (2)	184. (2)	185. (4)
186. (2)	187. (3)	188. (1)	189. (1)	190. (1)
191. (4)	192. (1)	193. (1)	194. (3)	195. (1)
196. (4)	197. (1)	198. (3)	199. (4)	200. (4)

SOLUTIONS

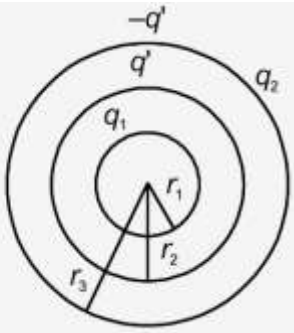
1. (3)

Suppose a guassian surface passes through conducting shell with radius (r_3)

Flux through it well be zero. So, net charge enclosed must be zero.

$\therefore q_1 + q' = 0$

$q' = -q_1$



2. (3)

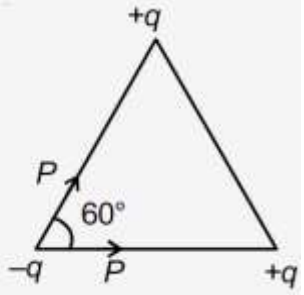
Charge with maximum curved path has highest charge to mass ratio.

3. (3)

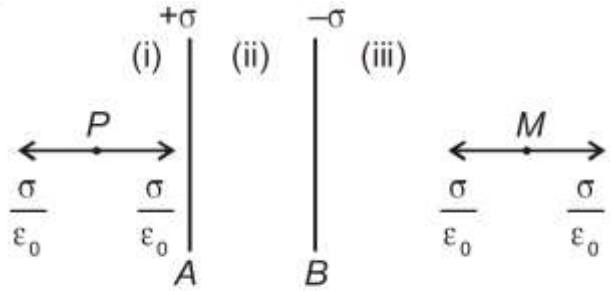
$P = qL$

$P_{net} = \sqrt{P^2 + P^2 + 2P^2 \cos 60^\circ}$

$P_{net} = \sqrt{3}P = \sqrt{3}qL$



4. (4)

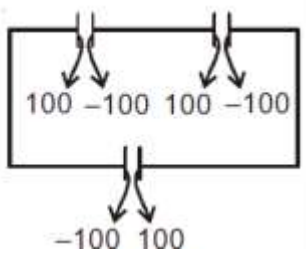


At points P and M is zero.

5. (4)

In the wires, the charge is 0, Thus final charge = 0

Thus $\Delta V = 0$

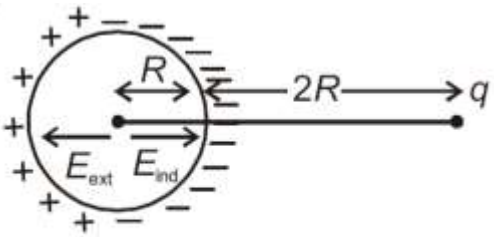


6. (2)

$$\vec{E}_{int} + \vec{E}_{ext} = 0$$

$$\vec{E}_{int} = \vec{E}_{ext}$$

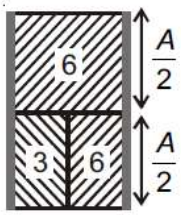
$$\vec{E}_{int} = \frac{kq}{9R^2}$$



7. (3)

$$C_1 = \frac{6A\varepsilon_0}{2d} = \frac{3A\varepsilon_0}{d}$$

$$C_2 = \frac{A\varepsilon_0}{2\left(d - \frac{d}{2}\left(1-\frac{1}{3}\right) - \frac{d}{2}\left(1-\frac{1}{6}\right)\right)}$$



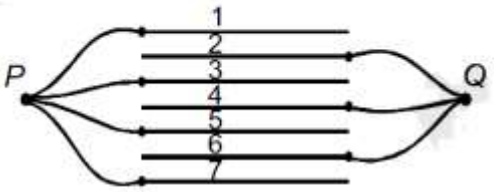
$$C_2 = \frac{A\varepsilon_0}{2\left(\frac{d}{6} + \frac{d}{12}\right)}$$

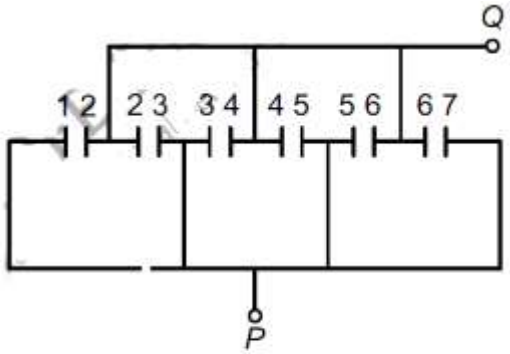
$$C_2 = \frac{A\varepsilon_0}{2\left(\frac{d}{4}\right)}$$

$$C_2 = \frac{2A\varepsilon_0}{d}$$

$$C = C_1 + C_2 = \frac{5A\varepsilon_0}{d}$$

8. (2)





All are in parallel

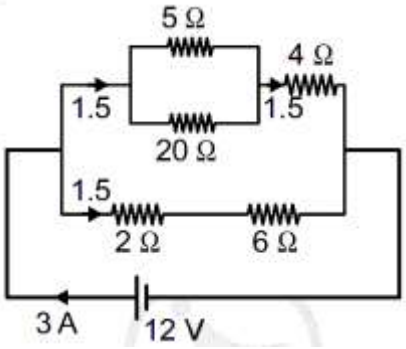
$$C_{net} = 6C = \frac{6A\varepsilon_0}{d}$$

9. (2)

Answer (2)

$i = \frac{12}{4} = 3A$

$\Delta V_4 = 6V$



10. (2)

For R = 4r, the sequence repeats itself.

11. (1)

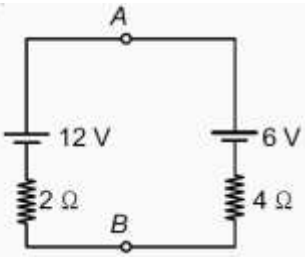
Answer (1)

$6 = 6i$

$i = 1\ A$

$\Delta V = 6 + 4$

$\Delta V = 10$

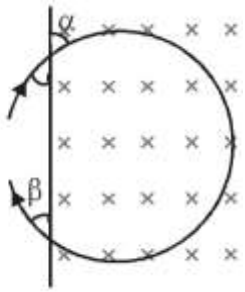


12. (4)

$\beta = \alpha$

$v_1 = v_2 \ (\because F_m \perp v)$

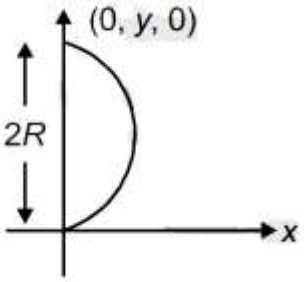
$T = \frac{2(\pi - \alpha)m}{qB}$



13. (3)

$\frac{q}{m} = \alpha$

$y = 2R = 2\left(\frac{mv}{qB}\right) = \frac{2v_0}{\alpha B_0}$



14. (4)

$B = \frac{\mu_0 i}{2R}\left(\frac{3\pi}{2(2\pi)}\right) = \frac{3\mu_0 i}{8R}$

15. (3)

$B = B_{\text{due to circular arc}} + B_{\text{due to straight wires}}$

$= \frac{\mu_0 i}{2R}\left(\frac{3\pi}{2.(2\pi)}\right) + \frac{\mu_0 i}{4\pi R}$

$\Rightarrow B = \frac{\mu_0 i}{4R}\left(\frac{3}{2} + \frac{1}{\pi}\right)\otimes$

16. (2)

$\cot^2\phi = \cot^2 45^o + \cot^2 30^o$

$\cot^2\phi = 1 + 3$

$\cot\phi = 2 \qquad \Rightarrow \phi = \cot^{-1}(2)$

17. (4)

18. (4)

19. (3)

The rod will experience magnetic force in the direction opposite to initial force. So velocity will decrease with time.

20. (2)

$\varepsilon = \frac{1}{2}B\omega R^2, R = 0.1\text{m}, B = 0.1\text{T}, W = 20\frac{\pi}{\text{s}}$

$\varepsilon = \frac{1}{2}(0.1)(0.1)^2(20\pi)$

$= \frac{\pi}{100}\text{volt}$

21. (2)

$\frac{\phi_A}{\phi_B} = \frac{N_A}{N_B}$

22. (4)

$\text{For } f = 0, X_L = 0 \text{ and } F \to \infty, X_C = 0$

23. (3)

$l_{avg} = \frac{\int l dt}{\int dt}$

$\text{So } l_{avg} = \frac{2l_0}{\pi}$

24. (1)

$$E_{total} = E_i + E_c = \frac{Q_0^2}{2C}$$

$$4E_i = \frac{Q_0^2}{2C}$$

$$E_i = \frac{Q_0^2}{8C} = \frac{1}{2}Li^2$$

$$i^2 = \frac{Q_0^2}{4LC}$$

$$i = \frac{Q_0}{2\sqrt{LC}}$$

25. (4)

All the statements are true.

26. (2)

For dispersion without deviation:

$A_1(\mu_1 - 1) + A_2(\mu_2 - 1) = 0$

$6(0.5) + A_2(0.75) = 0$

$A_2 = 4^o$

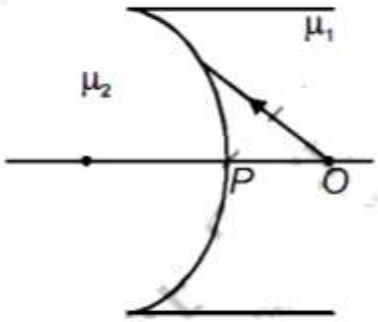
27. (4)

$$\frac{\mu_2}{v} - \frac{\mu_1}{u} = \frac{\mu_2 - \mu_1}{R}$$

$$\frac{1}{v} + \frac{1.5}{9} = \frac{0.5}{-12}$$

$$\frac{1}{v} = \frac{-1}{6} - \frac{1}{24}$$

$v = -4.8$



28. (1)

Power of concave lens $= -\frac{1}{0.25} = -4D$

Adding combination $= -4D + 2.5D = -1.5D$

29. (2)

$\lambda \propto \frac{1}{v}$

de Broglie wavelength of an electron depends on its velocities. Velocity of the electron is only decreasing in the IInd case.

30. (2)

$E = 2.48eV$

$E = \frac{hc}{\lambda}$

$\lambda = \frac{hc}{E}$

31. (4)

$KE_{max} = \frac{hc}{\lambda} - w_0$

Work function is negligible

$\frac{1}{2}mv^2 = \frac{hc}{\lambda}$

$\therefore \quad v^2 \propto \frac{1}{\lambda}$

If λ is increased to 4 times velocities become half.

32. (4)

Nuclear force being a short range force becomes unstable with too many nucleons.

33. (4)

$\frac{N}{N_0} = \left(\frac{1}{2}\right)n$

$\frac{1}{64} = \left(\frac{1}{2}\right)^n$

$n = 6$

Hence half life is 5 seconds.

34. (3)

35. (3)

Fact.

36. (2)

Gravitational force $F_1 = \frac{GM_P^2}{r^2}$

Electrostatic force $F_2 = \frac{1}{4\pi\varepsilon_0}\frac{e^2}{r^2}$

$\frac{F_2}{F_1} = \frac{e^2}{4\pi\varepsilon_0 G M_P^2}$

$\therefore$ Dimension less $\left[M^oL^oT^oA^o\right]$

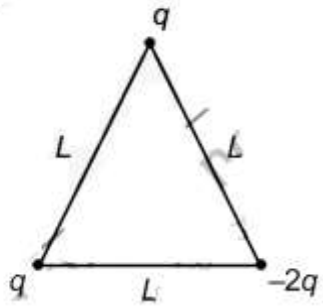
37. (1)

$U = \frac{k(q)(-2q)}{L} + \frac{k(q)(q)}{L} + \frac{k(q)(-2q)}{L}$

$U = \frac{-3kq^2}{L}$

$U_\infty = 0$

$W_{ext} = U_\infty - U = \frac{3kq^2}{L}$



38. (2)

$0.9 = E - 0.3\ r$

$1 = E - 0.25\ r$

$0.1 = 0.05\ r$

$r = 2\ r$

39. (4)

$\Delta q = \text{Area}(l/t)$

$\Delta q = \frac{1}{2}.10\times15 = 75C$

$i_{avg} = \frac{75}{15} = 5A$

40. (1)

Surface charge density = σ

Total charge on the ring (q) = $\sigma(2\pi a)d$

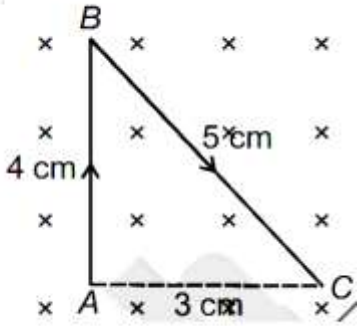
$\Rightarrow i = \frac{q}{T} = \sigma(2\pi a)df$

$\vec{B} = \frac{\mu_0 l}{2\pi a} = \frac{\mu_0(\sigma 2\lambda\pi a df)}{2\pi a} = \pi\mu_0\alpha df$

41. (2)

Force on wire *ABC* will be same as force on wire *AC*,

using $F = i(\vec{l} \times \vec{B})$



$$F = 2\left(\frac{3}{100}\right)(2)\sin 90^\circ$$

$$= 12 \times 10^{-2} \text{ N}$$

$$a = \frac{F}{m} = \frac{12 \times 10^{-2}}{10^{-2}} = 12 \text{ m/s}^2$$

42. (2)

43. (1)

Using Lenz's law, current in A will be clockwise.

44. (3)

$$B = \frac{\mu_0}{4\pi}\frac{qv}{r^2}$$

when q approaches the loop 'r' decreases when q goes away from the loop 'r' increases so using Lenz law induced current will be first clockwise then anticlockwise.

45. (3)

$$\frac{N_P}{N_S} = \frac{V_P}{V_S}$$

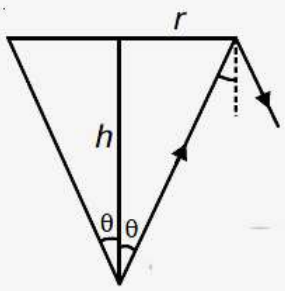
$$V_S = \frac{N_S V_P}{N_P}$$

$$= \frac{50}{11}(220) = 1000\text{V}$$

46. (3)

$h = 12$

$\theta = i_C$



$$\sin i_c = \frac{1}{\mu_w}$$

$$\sin i_c = \frac{3}{4}$$

$$r = h \tan i_C$$

$$r = h\frac{3}{\sqrt{16-9}}$$

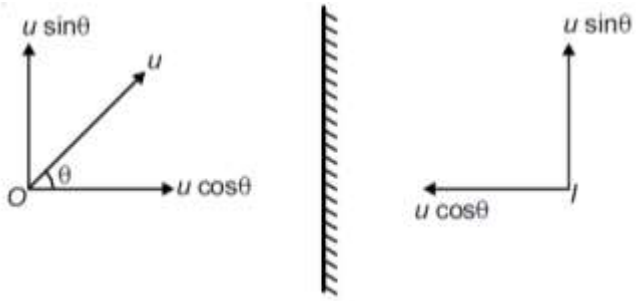
$$r = \frac{36}{\sqrt{7}}$$

47. (3)

$$\vec{V}_{I_0} = \vec{V}_I - \vec{V}_0$$

$$\vec{V}_{I_0} = -u\cos\theta\,\hat{i} + u\sin\hat{j} - (u\cos\theta\,\hat{i} + u\sin\theta\hat{j})$$

$$\vec{V}_{I_0} = -2u\cos\theta\hat{i}$$



Straight line and horizontal

48. (2)

Wavelength is changed from 4000 Å to 3000 Å

$$\frac{hc}{\lambda_1} = \text{KE}_{max} + w_0$$

$$\frac{hc}{\lambda_2} = \text{KE}_{max(2)} + w_0$$

$$\frac{hc}{\lambda_1} - \frac{hc}{\lambda_2} = \text{KE}_{max} - \text{KE}_{max(2)}$$

$$\frac{hc}{\lambda_1} - \frac{hc}{\lambda_2} = eV$$

$$\left(\frac{hc}{\lambda_1} - \frac{hc}{\lambda_2}\right) \times \frac{1}{e} = V$$

$V = 1.03$ V

49. (2)

Energy it gains = 225 eV

$$\lambda = \frac{h}{mv} = \frac{\lambda h}{\sqrt{2mE}}$$

50. (2)

$m = 10$ g at $t = 0$

$m = m_0 e^{-\lambda t}$

where $t = \frac{2}{\lambda}$

$$m = \frac{m_0}{e^2}$$

51. (3)

Condensation polymers are generally made by condensation of two different molecules. For e.g. in bakelite phenol and formaldehyde are used.

52. (1)

$$\Delta S = S_{xy_3} - \frac{1}{2}S_{x_2} - \frac{3}{2}S_{y_2}$$

$$\Delta S = 50 - \frac{1}{2}\times 60 - \frac{3}{2}\times 40$$

$$= -40 JK^{-1}mol^{-1}$$

At equilibrium $\Delta G = 0$

$$\Delta G = \Delta H - T\Delta S$$

$$0 = -30 - \left(-40\times 10^{-3}\times T\right)$$

$$T = 750K$$

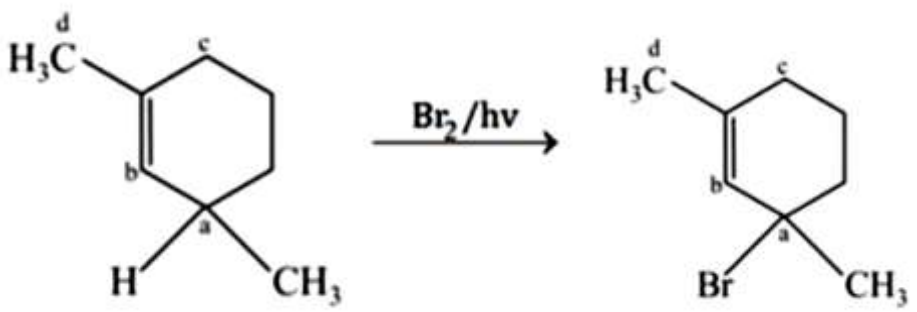
53. (4)

$$\ln K = \ln A - \frac{E_a}{R}\times\frac{1}{T}$$

$$\text{Slope} = -\frac{E_a}{R} = \frac{-8.3\times 10^3}{8.3} = -1000$$

54. (1)

As most stable free radical (*allyl* + t^o) is formed at 'a' so bromination occurs here to give major product.



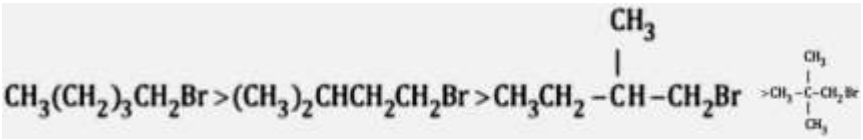
55. (3)
For glucose, sucrose, i =1. For NaCl and $CaCl_2$ the values of van't Hoff factor are 2 and 3 respectively.
$\Delta T_b = k_b(im)$
So effective ΔT_f for glucose, sucrose, NaCl and $CaCl_2 \propto \frac{1\times10}{180}, \frac{1\times10}{342}, \frac{2\times10}{58.5}$ and $\frac{3\times10}{111}$
Thus, elevation in boiling point is maximum in case of NaCl solution and hence, NaCl would have maximum boiling point. (Boiling point of solution=Boiling point of solvent $+\Delta T_b$)

56. (4)
The given compound $K_2[PtCl_4]$ and Na_2SO_4 on ionization is water give the same number of ions, i.e.,
$K_2[PtCl_4] \rightleftharpoons 2K^+ + [PtCl_4]^{2-}$
$Na_2SO_4 \rightleftharpoons 2Na^+ + SO_4^{2-}$
Hence both have comparable molar conductivities in aqueous solution.

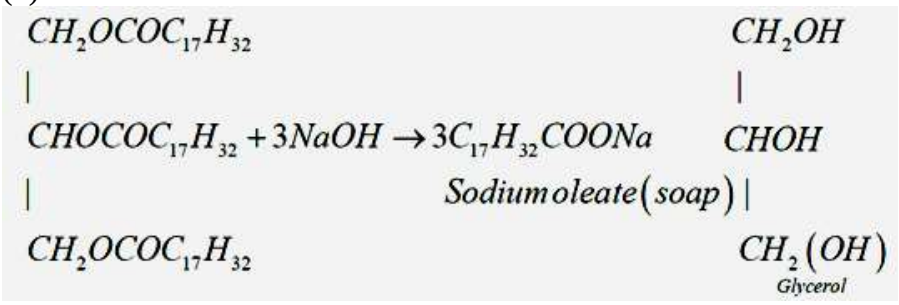
57. (2)
Open-chain glucose,$HOCH_2\ CHOH\ CHOH\ CHOH\ CHOH\ CHO$ has, four chiral carbons (asterisked carbons) and open chain fructose,
$HOCH_2CHOH\ CHOH\ CHOH\ COCH_2OH$ has three chiral carbons.

58. (4)
Using plastic is not a part of the green chemistry since plastic is non-biodegradable. Rest other are part of green chemistry.

59. (1)
Order of reactivity of alkyl halides towards S_N2 reaction is $1^0 > 2^0 > 3^0$. Here the reactivity order is as follows



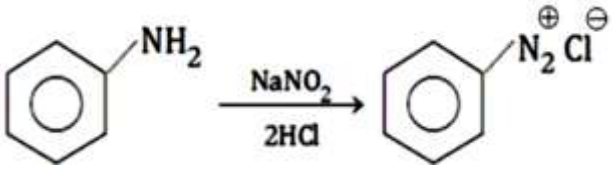
60. (4)



61. (1)
Transition metals have high enthalpies of atomization, because they form strong metallic bonds, due to participation of (n - 1) d-electrons along with ns-electrons in metallic bonding.
This is due to the greater effective nuclear charge acting on outer valence electrons, because of weak shielding of nucleus by 4f-electrons
The normal size increase from Zr to Hf is almost exactly balanced by lanthanide contraction

Because of small size, atoms of H, He, C, N occupy the vacant spaces in the crystal lattice of transition metal.

62. (1)



63. (3)
As per as EEC (European Environment Commission) $NO_3^- > 50PPm$ in water may lead to methemoglobinemia (Blue baby syndrome)

64. (2)

65. (3)

66. (2)

67. (3)

68. (3)

69. (3)

70. (1)

71. (1)

72. (2)

73. (3)

74. (2)

75. (4)

76. (1)

77. (4)

78. (1)

79. (2)

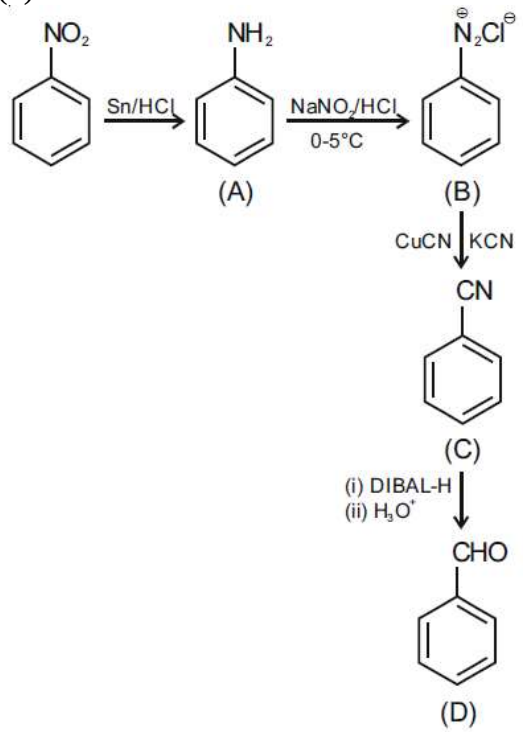
80. (3)
$[NiCl_4]^{2-}$ is sp^3 hybridised. The complex has 2 unpaired electrons.

81. (3)

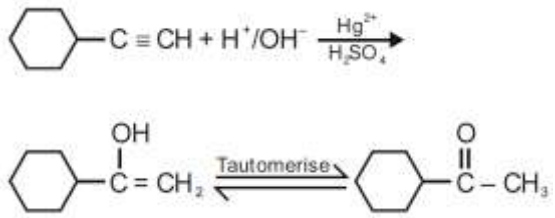
82. (3)

83. (1)

84. (3)



85. (1)



86. (2)

For Freundlich isotherm

$$\log\frac{x}{m} = \log k + \frac{1}{n}\log p$$

Intercept (c) = log k

87. (3)

The solutions of acetone and benzene shows positive deviation because the interaction between acetone and benzene molecule is lesser than the interaction between like molecules i.e. in between acetone or in between benzene.

88. (4)

Tertiary amines do not react with Hinsberg's reagent.

89. (2)

90. (4)

91. (2)

Stability of carbocation and (C – O) bond cleavage.

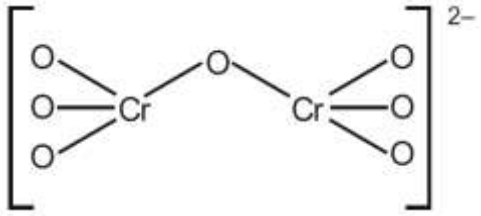
92. (4)

93. (4)
Alcohol does not give addition product with $NaHSO_3$

94. (4)

95. (2)

96. (2)



97. (3)
Mischmetal consist of lanthanoid metal (~ 95%),
Fe(~ 5%) and traces of S, C, Ca and Al.

98. (2)

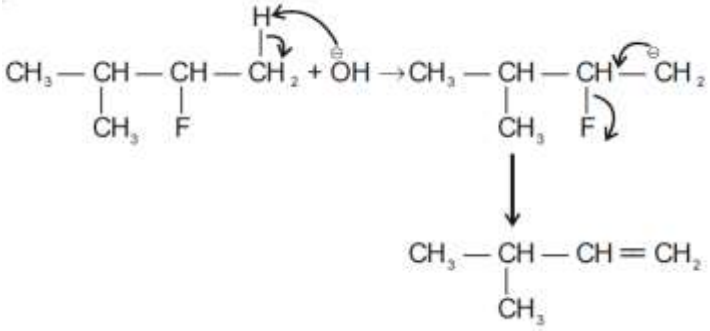
99. (2)

$$4r = \sqrt{3}a$$

$$r = \frac{\sqrt{3}}{4}a$$

$$= \frac{\sqrt{3}}{4} \times 300 = 75\sqrt{3}\text{pm}$$

100. (3)



151. NCERT XII pg 48. The event associated with LH surge is ovulation.

152. NCERT XII pg 157. Malignant tumour usually spreads to other parts of body, causing huge damage to the tissues concerned and is characterised by metastasis.

153. NCERT XII pg 136 – 137. Gene migration or gene flow disturbs Hardy – Weinberg equilibrium.

154. NCERT XII pg 204

155. NCERT XII pg 43. Most suitable temperature for spermatogenesis is approx. 35°C.

156. NCERT XII pg 150.Gambusia is larvicidal fish and used to control malaria. Typhoid caused by bacteria that is not spread through mosquitoes.

157. Rapid division of cells by mitotic cell division.

158. Cry I Ab- corn borer, First transgenic cow-Rosie, Eli Lily and company- humulin

159. Generally chances of conception are high during 14^{th} day of menstrual cycle as female is ovulating. Contraception pills may be taken daily for period of 21 days during each menstrual cycle.

160. The mechanism of gene regulation is different in humans and bacteria as human cell is eukaryoyic and bacteria is a prokaryote .Also bacteria lacks cellular machinery for processing proteins.

161. NCERT XII pg 64 . ICSI stands for Intra cytoplasmic sperm injection

162. Morula is 8-32 celled stage structure of the same size of zygote but as number of cells are more it contains more DNA content than zygote.

163. Sexual reproduction causes variation due to recombination of chromosomes .

164. NCERT pg 64. Embryo upto 8 blastomeres stage is introduced in fallopian tube and embryos more than 8 blastomeres i.e Morula is released in uterus.

165. Bacterium is the host cell. Plasmodium being a protozoan and pathogen is not used in genetic engineering. Bacteriophage is used as vector for bacteria .Plasmid is most ideal vector for bacteria.

166. Transgenic plants are the ones generated by introducing foreign DNA into a cell preferably callus i.e undifferentiated mass of cells and regenerating a plant from that cell .

167. Oral pills containing high progesterone level that inhibits LH and hence inhibits ovulation.

168. XII NCERT pg 208, last para. Bollworm is a type of lepidopterans.

169. XII NCERT pg 7,8 .In potato, banana and ginger, the plantlets arise from the nodes present in the modified stem.

170. XII NCERT pg 170

171. XII NCERT pg 49.

172. XII NCERT pg 202

173. XII NCERT pg 127

174. Taq polymerase is a thermophilic enzyme.

175. Proliferative phase: Rapid regeneration of endometrium and maturation of Graafian follicle .
Menstruation ; Breakdown of endometrium and ovum not fertilised .
Ovulation : LH and FSH attain peak level and progesterone secretion not yet started.

176. XII NCERT pg 130

177. XII NCERT pg 130,131
178. XII NCERT pg 200

179. XII NCERT pg 146,147. Typhoid is confirmed by Widal test.

180. XII NCERT pg 140

181. Discovery REN was responsible for genetic engineering.

182. Wing structure of butterfly, bat and bird are analogous organs and hence do not show adaptive radiation.

183.

184. XII NCERT pg 134

185. XII NCERT pg 140

186. Ethidium bromide used to make DNA bands visible during electrophoresis. Nitrocellulose paper is used during autoradiograpgy. *Taq* polymerase used in PCR

187. XII NCERT pg 159. Drugs obtained from leaves, resins and inflorescence of plant *Cannabis sativa* are called as cannabinoids..

188. In agar medium with antibiotics only the antibiotic resistant bacteria can survive.

189. B lymphocytes secrete antibodies against pathogens.

190. XII NCERT Pg. 168, 2nd para

191. XII NCERT pg 200,201

192.

193.

194. XII NCERT pg 197

195.

196. XII NCERT pg 58

197. Inner cell mass forms embryo and trophoblast forms covers of the embryo.

198. *A. indica* is not largest but most common honey bee of India. Drone of honey bee is haploid.

199. XI NCERT pg 156

200. The first transgenic cow, Rosie produced milk which was human alpha lactalbumin enriched . Restriction enzymes are used in cutting DNA.